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Leafy Spurge

Cooperative Extension, South Dakota State University

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Leafy Spurge

LEAFY SPURGE¹ is a deep-rooted perennial weed that spreads by seeds and underground parts. It is one of the most serious weeds in South Dakota. It covers over 67,000 acres and causes 10 to 100% reduction in crop yield. The exact amount depends on the intensity of the stand and fertility and moisture conditions. It is more difficult to eliminate than Canada thistle, perennial sowthistle, field bindweed, and hoary cress, but not as tough as Russian Knapweed.

The seeds are produced in 3-celled capsules which explode when ripe and spread the seeds 12 to 15 feet in each direction. The seeds are carried down draws by water and can be distributed by birds, animals, or man.

The strong reddish-brown rootstalks penetrate the soil at least 8 feet and probably farther. These vertical roots send out horizontal roots at least 3½ feet long. They give rise to new plants. Roots also have pink buds that develop into new shoots when top growth is removed.

Leafy spurge develops earlier in the spring than any of the other noxious weeds except hoary cress. It normally emerges early in April and is full grown (1 to 3 feet tall) and flowering by late May or early June. This early, rapid, rank growth gives the weed a great competitive advantage over spring-sown crops and all low-growing crops. At flowering time the upper bracts (round leaves) are greenish-yellow. When top growth is plowed or cut back, it will emerge and flower any time during the summer.

INTENSIVE CULTIVATION

Cultivation from immediately after small grain harvest until freezeup (Oct. 15) followed with a full year of intensive cultivation (May 15 to Oct. 15) the next year will kill a high percentage of the weeds. Sometimes there will be stragglers to clean up the next year. In other cases a single year of cultivation will kill 85 to 90% of the weeds.

A duckfoot field cultivator is one of the few implements that will cut the heavy tough roots of leafy spurge. If there is considerable plant residue on the area, use the moldboard plow for the first operation. Equip the cultivator with wide sweeps (12 to 24 inches) that overlap 3 to 4 inches. Keep them sharp; be sure they are flat when in the soil and operating at a depth of 4 to 5 inches.

It takes 7 to 10 days for new shoots to emerge after the roots have been cut. Another 7 to 10 days elapse before there are enough leaves to produce more food than is needed for growth. Therefore, little plant food is stored in the roots and the root reserves are being used for plant growth for a period of 14 to 20 days after each cultivation.

Cultivate every 2 weeks during good growing conditions and every 3 weeks during dry, hot weather when plants are growing less rapidly. This generally means that cultivation should be done at 2-week intervals during May, June, and July and 3-week intervals during August, September, and October.

Combining intensive cultivation for part of the season with the production of a crop and an application of a chemical is generally more practical than an entire season of cultivation. You get income from the crop and greatly reduce hazards from erosion resulting from a full season of cultivating. However, more time will be required to eliminate the weeds.

SPRAYING

For leafy spurge, 2,4-D is equal to or superior to MCPA, 2,4,5-T, 2,4-DB, and other related chemicals. Use an ester form of 2,4-D because amine forms are not readily absorbed.

¹*Enphorbia esula* L.

By Lyle A. Derscheid, Experiment Station Agronomist, and
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(Experiment Station Project 32-R)

Leafy Spurge

Control and Elimination of

Cooperative Extension Service



F.S. 22

One-fourth pound causes the weed to wilt, but several treatments with much higher rates are required to reduce stand.

Use one-third to one-half pound of 2,4-D acid per acre to kill seedlings. Use one-half to 1 pound per acre on old plants to prevent seed production and to prevent the weed from spreading. Spray during late May or early June. Follow-up treatments during late August with 1 pound or more per acre will reduce the stand somewhat. Two applications (May and late August) of 1 to 1½ pounds each in a bromegrass sod will reduce the stand. Elimination may be obtained if these treatments are repeated for 3 to 5 years.

TBA (2,3,6-trichlorobenzoic acid) is effective for eliminating leafy spurge. One application of 20 pounds of 2,3,6-TBA



acid equivalent per acre will generally give 90 to 100% elimination. Two brands—"Benzac 1281" and "Trysben 200"—are available. Use 10 gallons per acre as each contains 2 pounds of 2,3,6-TBA acid per gallon.

PBA (polychlorobenzoic acid) is sold under the brand names of "Zobar" and "Benzac 354." Each contains 4 pounds of TBA acid per gallon. Use 40 pounds of TBA acid (10 gallons) per acre to get 80 to 100% elimination.

Both TBA and PBA are nonselective. They will kill any crop and the residual effect prevents or reduces crop production for 1 or more years after application.

CULTIVATION, CROPS, CHEMICALS

Small Grains and Corn. Leafy spurge starts early in the spring and gets ahead of spring-seeded grain. Use one-half pound of 2,4-D ester per acre to check weed growth, so the grain can get ahead and hold the weeds in check until harvest. (This treatment applied to Mo-0-205 and Garry oats in the 5-leaf stage of growth did not injure the crop in several experiments and probably will not injure wheat or barley at the same stage.) Spray after harvest to prevent late seed production. This system controls the weed but seldom reduces the stand. However, the weed can be eliminated in several years by alternating this system with some other treatment that will reduce the stand, such as intensive cultivation or a close-drilled summer crop.

A high percentage of the leafy spurge can be killed in 3 to 5 years by spraying the small grain crop and cultivating after harvest each year. Use three-fourths to 1 pound of 2,4-D ester per acre when the grain is in the 5-leaf stage. Use a duck-foot cultivator three or four times after harvest. In areas where erosion is a problem, winter grains have an advantage in that they provide cover over winter. Spray them about May 20 before the boot begins to swell. They emerge earlier in the spring and offer more competition, but do not allow for as many after-harvest cultivations.

If corn is raised any of the 3 to 5 years, spray during June. Use drop nozzles after tasseling with the same rates as for small grain. There is some danger of injuring the corn with the June treatment. Cultivate the crop at least four or five times—two or three times lengthwise and twice crosswise.

Treatment with 2,4-D in the grain, 2,3,6-TBA after harvest, and a fall plowing usually kills 75 to 85% of the leafy spurge in 1 year. Use one-third to one-half pound acid equivalent of a 2,4-D ester when the grain is in the 5-leaf stage. Use 5 pounds acid equivalent of the TBA as soon as the weeds have made regrowth after harvest. Plow 10 days after spraying with TBA. The residual effect of the 2,3,6-TBA may injure a crop of small grain seeded the following year, but probably will not damage corn seeded late in May.

The use of amitrol instead of TBA will generally kill 65 to 70% of the spurge in 1 year. Use 6 pounds active ingredient of the amitrol and plow 15 days later. The residual effect of the amitrol probably will not damage a crop seeded the following year.

TBA and amitrol kill leafy spurge if applied before you plant corn. Spray with 5 pounds of 2,3,6-TBA or 6 pounds of amitrol as soon as the weeds are 6 to 12 inches tall (about May 10). Plow 10 days later and plant an early corn hybrid. Spray the corn with one-third to one-half pound of 2,4-D ester per acre after the first cultivation and cultivate 2 or 3 times after spraying.

TBA generally kills 80 to 90% of the spurge, but it may damage the corn. In one research test, it killed 90% of the corn when there was no rainfall between the spraying and

plowing, but there was no damage in 6 other experiments.

Amitrol generally kills 70 to 80% of the spurge and does not damage the corn.

Almost complete elimination can be obtained in 2 years by using 2,3,6-TBA as described above, before planting corn one year and after harvesting small grain the next.

Summer Crops. Close-drilled crops of sudangrass or buckwheat are more strongly competitive than most other crops. Cultivate three times before seeding the crop during late June. Harvest the crop, fall plow, and cultivate once or twice. This system reduces the stand of spurge about 50% in 1 year and 80% in 2 years. It may be used to reduce the stand on alternate years and small grain sprayed with 2,4-D can be used to provide income and hold the weeds in check on alternate years. Close-drilled soybeans and forage sorghum should be equal to buckwheat and sudangrass.

Forage Crops. Alfalfa is not a good competitive crop for controlling leafy spurge. The weed emerges before or at the same time that alfalfa commences spring growth, and the spurge produces rank growth which stays ahead of the crop.

Bromegrass holds the weed in check if it has been weakened by cultivation beforehand. Cultivate with a duckfoot cultivator every 2 weeks between May 15 to August 15. Seed bromegrass at the rate of about 12 pounds per acre. The stand of spurge is generally reduced 90 to 95% by this treatment. It can be further reduced by spraying with one pound of 2,4-D ester twice a year (May and late August).

If the cultivation is omitted and bromegrass sod is sprayed twice a year, the stand can be slowly reduced. In 3 to 5 years, 90% of the spurge can be killed.

GRAZING

Grazing sheep will considerably reduce the stand of spurge. Start grazing during early spring so that they develop a taste for the weed. Rotate cattle ahead of the sheep if the sheep do not keep the grass grazed. Heavy grazing will eliminate as much as 75 to 85% of the spurge in one year. Intensive overgrazing is required to eliminate the remaining plants and sometimes does not do it.

SOIL STERILANTS

Numerous soil sterilants can be used to eliminate patches (weed nurseries) of leafy spurge with one treatment. Most of the chemicals are more effective when applied between September 1 and December 1; however, good results are often obtained from summer applications. Apply the chemical to a band 6 or 8 feet wide around the outside of the patch to kill roots that extend beyond the patch.

The following chemicals generally give 95 to 100% elimination when applied at the rates designated below for each square rod. Use the higher rates for summer application.

Brand Name	Rate per Square Rod	Cost*
Ammate "X"	4 to 6 pounds	\$1.40
Atlacide	6 to 8 pounds	1.08
Chlorax	10 to 12 pounds	3.20
Chlorea	6 to 8 pounds	1.90
Concentrated Borascu	10 pounds	0.70
DB Granular	5 to 6 pounds	0.95
Novon Concentrate	½ to 1 quart	0.76
Polybor-chlorate	10 to 12 pounds	1.75
Sodium Chlorate	5 pounds	0.90
TBA	½ pint	0.63

*Approximate retail cost of chemical for 1 square rod at lower rate for areas 10 to 15 square rods in size. Cost decreases for large areas and varies somewhat with local situations.